

**Table F1-1
Cost Summary of Soil Remedial Alternatives**

Alternative	General Response Action	Technology	Soil Volume	Capital Costs	Mob/Demob	Engineering	Construction Oversight	Contingency	Post Construction Maintenance	Total
S1	No Action	No Action	cy	\$0	\$0	\$0	\$0		\$0	\$0
			na							
S2	Containment - Eng. Surface Barriers	Upper Bluff Area	na	\$105,556	\$5,278	\$15,833	\$15,833	\$21,111	\$0	\$163,611
		Kreher Park	na	\$1,118,563	\$55,928	\$167,784	\$167,784	\$223,713	\$21,716	\$1,755,488
		Total		\$1,224,118	\$61,206	\$183,618	\$183,618	\$244,824	\$21,716	\$1,919,099
S3A	Removal - limited removal & offsite disposal	Upper Bluff Area	9,550	\$2,203,435	\$110,172	\$330,515	\$330,515	\$440,687	\$0	\$3,415,324
		Kreher Park	4,800	\$973,848	\$48,692	\$146,077	\$146,077	\$194,770	\$0	\$1,509,464
		Total	14,350	\$3,177,283	\$158,864	\$476,592	\$476,592	\$635,457	\$0	\$4,924,788
S3B	Removal - unlimited removal & offsite disposal	Upper Bluff Area	35,000	\$5,103,860	\$255,193	\$765,579	\$765,579	\$1,020,772	\$0	\$7,910,983
		Kreher Park	225,000	\$22,591,722	\$1,129,586	\$3,388,758	\$3,388,758	\$4,518,344	\$0	\$35,017,169
		Total	260,000	\$27,695,582	\$1,384,779	\$4,154,337	\$4,154,337	\$5,539,116	\$0	\$42,928,152
S4A	Removal - limited removal & onsite disposal (one acre disposal cell)	Upper Bluff Area	9,550	\$1,451,850	\$72,593	\$217,778	\$217,778	\$290,370	\$0	\$2,250,368
		Kreher Park	4,800	\$1,054,203	\$52,710	\$158,130	\$158,130	\$210,841	\$0	\$1,634,014
		Total	14,350	\$2,506,053	\$125,303	\$375,908	\$375,908	\$501,211	\$0	\$3,884,382
S4B	Removal - unlimited limited removal & onsite disposal (four acre disposal cell)	Upper Bluff Area	35,000	\$1,788,580	\$89,429	\$268,287	\$268,287	\$357,716	\$0	\$2,772,299
		Kreher Park	4,800	\$2,364,788	\$118,239	\$354,718	\$354,718	\$472,958	\$0	\$3,665,421
		Total	39,800	\$4,153,368	\$207,668	\$623,005	\$623,005	\$830,674	\$0	\$6,437,720
S5A	Ex-situ Thermal Treatment (Onsite thermal desorption)	Upper Bluff Area	9,550	\$3,036,291	\$151,815	\$455,444	\$455,444	\$607,258	\$0	\$4,706,250
		Kreher Park	4,800	\$1,392,456	\$69,623	\$208,868	\$208,868	\$278,491	\$0	\$2,158,306
		Total	14,350	\$4,428,746	\$221,437	\$664,312	\$664,312	\$885,749	\$0	\$6,864,557
S5B	Ex-situ Thermal Treatment (Offsite incineration)	Upper Bluff Area	9,550	\$5,228,016	\$261,401	\$784,202	\$784,202	\$1,045,603	\$0	\$8,103,424
		Kreher Park	4,800	\$2,436,468	\$121,823	\$365,470	\$365,470	\$487,294	\$0	\$3,776,525
		Total	14,350	\$7,664,483	\$383,224	\$1,149,672	\$1,149,672	\$1,532,897	\$0	\$11,879,949
S6	Ex-situ Physical/Biological Treatment (onsite soil washing)	Upper Bluff Area	9,550	\$3,671,748	\$183,587	\$550,762	\$550,762	\$734,350	\$0	\$5,691,209
		Kreher Park	4,800	\$1,711,848	\$85,592	\$256,777	\$256,777	\$342,370	\$0	\$2,653,364
		Total	14,350	\$5,383,595	\$269,180	\$807,539	\$807,539	\$1,076,719	\$0	\$8,344,573

Table F1-2
Summary of Wastewater Treatment Volumes for Potential Groundwater Remedial Alternatives

Soil Remedial Alternatives		Waster Generation	Wastewater Volume Copper Falls	Wastewater Volume Filled Ravine	Wastewater Volume Kreher Park
S-1	No Action	none	none	none	none
S-2	Containment - surface barrier (partial cap)	none	none	none	none
S-3A	Removal - limited removal & off-site disposal	construction dewatering	none	5 gpm for 20 days	5 gpm for 20 days
S-3B	Removal - unlimited removal & off-site disposal	construction dewatering	none	5 gpm for 60 days	20 gpm for 180 days
S-4A	Removal - limited removal & on-site disposal	construction dewatering	none	5 gpm for 20 days	5 gpm for 20 days
S-4B	Removal - unlimited limited removal & on-site disposal	construction dewatering	none	5 gpm for 60 days	5 gpm for 20 days
S-5A	Ex-situ Thermal Treatment (On-site thermal desorption)	construction dewatering	none	5 gpm for 20 days	5 gpm for 20 days
S-5B	Ex-situ Thermal Treatment (Off-site incineration)	construction dewatering	none	5 gpm for 20 days	5 gpm for 20 days
S-6	Ex-situ Physical/Biological Treatment	construction dewatering	none	5 gpm for 20 days	5 gpm for 20 days

Table F1-3
Alternate S2A Containment Using Engineered Surface Barriers (Partial Surface Barriers at Kreher Park)

Containment: **Surface Barriers**

1 Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:

16,000 sq ft

22,000 sq ft

98,000 sq ft

NSPW Property South of St. Claire Street

NSPW Property North of St. Claire Street

Marina Parking Lot Area

2 Low Permeability Cap -

Includes 3 feet of clay.

42,500 sq ft

72,000 sq ft

Former Coal Tar Dump Area

WWTP Area (includes TW-11 Area)

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Installation of new asphalt pavement	sq. yd.	1,778	\$25	\$44,444	NSPW Property South of St. Claire Street (includes grading) NSPW Property North of St. Claire Street (includes grading)
2	Installation of new asphalt pavement	sq. yd.	2,444	\$25	\$61,111	
				Subtotal	\$105,556	
	Mobilization/Demobilization @	5%	of	\$105,556	\$5,278	
	Engineering @	15%	of	\$105,556	\$15,833	
	Construction Oversight @	15%	of	\$105,556	\$15,833	
				Subtotal	\$142,500	
	Contingency	20%	of	\$105,556	\$21,111	
				Total	\$163,611	

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
2	Clear & Grub	est.	1	\$10,000	\$10,000	
3	Installation of low permeability cap	cy	4,722	\$25	\$118,056	3 ft. of clay over former coal tar dump area 0.5 ft. topsoil cover over clay cap Seeding
4	Top Soil	sq. yd.	4,722	\$18	\$85,000	
5	Vegetation	acre	1	\$3,500	\$3,500	3 ft. of clay over former coal tar dump area 0.5 ft. topsoil cover over clay cap Seeding
6	WWTP Building Demolition	est.	1	\$250,000	\$250,000	
7	Installation of low permeability cap	cy	8,000	\$25	\$200,000	3 ft. of clay over former coal tar dump area 0.5 ft. topsoil cover over clay cap Seeding
8	Top Soil	sq. yd.	8,000	\$18	\$144,000	
9	Vegetation	acre	1.7	\$3,500	\$5,785	For post-remediation storm water management
10	Storm water Drainage System	est.	1	\$30,000	\$30,000	
				Subtotal	\$1,118,563	
	Mobilization/Demobilization @	5%	of	\$1,118,563	\$55,928	
	Engineering @	15%	of	\$1,118,563	\$167,784	
	Construction Oversight @	15%	of	\$1,118,563	\$167,784	
				Subtotal	\$1,510,060	
	Contingency	20%	of	\$1,118,563	\$223,713	
				Total	\$1,733,772	

Table F1-3
Alternate S2A Containment Using Engineered Surface Barriers (Partial Surface Barriers at Kreher Park)

Post Construction

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>
1	Annual Inspections	yr	30	\$250	\$7,500
2	Post-Closure Reporting/Record Keeping	yr	30	\$500	\$15,000
3	Cap Maintenance	yr	30	\$1,000	\$30,000
	Subtotal			\$1,750	\$52,500
Present worth @7% Discount					\$21,716

GRAND TOTAL \$1,919,099

Summary

	<u>Capital Cost</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>OM & M Costs</u>	<u>Estimated Cost</u>
<i>Upper Bluff Area</i>							
Installation of asphalt pavement - upper bluff area	\$105,556	\$5,278	\$15,833	\$15,833	\$21,111	\$0	\$163,611
<i>Kreher Park</i>							
Installation of asphalt pavement - Kreher Park (marina parking lot)	\$272,222	\$13,611	\$40,833	\$40,833	\$54,444	\$21,716	\$443,660
Installation of a clay cap - Kreher Park (former coal tar dump area)	\$216,556	\$10,828	\$32,483	\$32,483	\$43,311		\$335,661
WWTP Building Demo and Clay Cap (includes TW-11 Area)	\$629,785	\$31,489	\$94,468	\$94,468	\$125,957		\$976,167
Estimated Cost	\$1,118,563	\$55,928	\$167,784	\$167,784	\$223,713	\$21,716	\$1,755,488
Total Estimated Cost	\$1,224,118	\$61,206	\$183,618	\$183,618	\$244,824	\$21,716	\$1,919,099

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1- 4
Alternate S3A: Limited Removal and Off-site Disposal

Containment:

Excavation - Limited Removal
Remove NAPL contaminated soil

1.7 ton/cubic yard

Volume to Remove
9,400 cy
150 cy
4,800 cy

NSPW Property South of St. Claire Street
NSPW Property North of St. Claire Street
Former Coal Tar Dump Area

Surface Barriers

Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:
26,000 sq ft
22,000 sq ft
98,000 sq ft

NSPW Property South of St. Claire Street
NSPW Property North of St. Claire Street
Marina Parking Lot Area

Low Permeability Cap -

Includes 3 feet of clay.

42,500 sq ft

Former Coal Tar Dump Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000	Center section of NSPW building overlying filled ravine. Removal/demolition of buried gas holders.
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000	
3	Excavation	cy	9,550	\$5	\$47,750	
4	Transportation	ton	16,235	\$25	\$405,875	Pumps and holding tanks Existing treatment system (5 gpm for 20 days) NSPW Property North of St. Claire Street (includes grading) Includes move/abandon existing buried sanitary and gas utilities \$15/hr X 24 hr X 7 days + \$25/day (expenses) Fence around excavation area
5	Disposal	ton	16,235	\$18	\$292,230	
6	Backfill	cy	9,550	\$12	\$114,600	
7	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	
8	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	
9	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000	
10	Move/Abandon Existing Utilities and Wells	ls	1	\$10,000	\$10,000	
11	24 hr. Security of Site	weekly	4	\$2,695	\$10,780	
12	Perimeter Fence	In ft	500	\$20	\$10,000	
				Subtotal	\$2,203,435	
Mobilization/Demobilization @		5%	of	\$2,203,435	\$110,172	
Engineering @		15%	of	\$2,203,435	\$330,515	
Construction Oversight @		15%	of	\$2,203,435	\$330,515	
				Subtotal	\$2,974,637	
Contingency @		20%	of	\$2,203,435	\$440,687	
				Total	\$3,415,324	

Table F1- 4
Alternate S3A: Limited Removal and Off-site Disposal

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	
2	Excavation	cy	4,800	\$5	\$24,000	Former coal tar dump area to 5 feet.
3	Transportation	ton	8,160	\$25	\$204,000	
4	Perimeter Fence	ton	8,160	\$18	\$146,880	
5	Backfill	cy	4,800	\$12	\$57,600	Former coal tar dump area Pumps and holding tanks
7	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	
8	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	
9	Installation of low permeability cap	cy	4,722	\$25	\$118,056	Existing treatment system (5 gpm for 20 days)
10	Top Soil	sq. yd.	4,722	\$18	\$85,000	3 ft. of clay over former coal tar dump area
11	Vegetation	acre	1	\$3,500	\$3,500	0.5 ft. topsoil cover over clay cap
12	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Seeding
13	24 hr. Security of Site	weekly	2	\$2,695	\$5,390	Marina Parking Lot Area
14	Perimeter Fence	In ft	750	\$20	\$15,000	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
				Subtotal	\$973,848	Fence around excavation area
Mobilization/Demobilization @		5%	of	\$973,848	\$48,692	
Engineering @		15%	of	\$973,848	\$146,077	
Construction Oversight @		15%	of	\$973,848	\$146,077	
				Subtotal	\$1,314,695	
Contingency @		20%	of	\$973,848	\$194,770	
				Total	\$1,509,464	

GRAND TOTAL \$4,924,788

Summary

	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$2,203,435	\$110,172	\$330,515	\$330,515	\$440,687	\$3,415,324
Limited removal and off-site disposal - Kreher Park	\$973,848	\$48,692	\$146,077	\$146,077	\$194,770	\$1,509,464
Total Estimated Cost	\$3,177,283	\$158,864	\$476,592	\$476,592	\$635,457	\$4,924,788

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1-5
Alternate S3B: Unlimited Removal and Off-site Disposal

Containment:

Excavation - Unlimited Removal

Remove all fill material

1.7 ton/cubic yard

Volume to Remove

35,000 cy

12,000 cy

225,000 cy

Fill material in filled ravine volume

Fly ash within filled ravine (not contaminated with NAPL)

Fill material in Kreher Park

Surface Barriers

Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:

26,000 sq ft

22,000 sq ft

98,000 sq ft

NSPW Property South of St. Claire Street

NSPW Property North of St. Claire Street

Marina Parking Lot Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000	Center section of NSPW building overlying filled ravine.
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000	Removal/demolition of buried gas holders.
3	Excavation	cy	35,000	\$5	\$175,000	All fill material
4	Transportation - off-site landfill	ton	59,500	\$25	\$1,487,500	NAPL contaminated soil and non fly ash debris
5	Disposal - off-site landfill	ton	59,500	\$18	\$1,071,000	NAPL contaminated soil and non fly ash debris
4	Transportation - NSPW landfill	ton	20,400	\$25	\$510,000	Fly ash material
5	Disposal - NSPW landfill	ton	20,400	\$18	\$367,200	Fly ash material
6	Backfill - salvaged from Kreher Park	cy	35,000	\$3	\$105,000	Clean fill salvaged from Kreher Park
7	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	Pumps and holding tanks
8	Waste water treatment	Gallon	432,000	\$0.05	\$21,600	Existing treatment system (5 gpm for 60 days)
9	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000	NSPW Property North of St. Claire Street (includes grading)
10	Move/abandon existing utilities and wells	ls	1	\$10,000	\$10,000	Includes move/abandon existing buried sanitary and gas utilities
11	24 hr. Security of Site	weekly	8	\$2,695	\$21,560	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
12	Perimeter Fence	In ft	1,500	\$20	\$30,000	Fence around excavation area
Subtotal					\$5,103,860	
Mobilization/Demobilization @				5%	\$255,193	
Engineering @				15%	\$765,579	
Construction Oversight @				15%	\$765,579	
Subtotal					\$6,890,211	
Contingency @				20%	\$1,020,772	
Total					\$7,910,983	

**Table F1-5
Alternate S3B: Unlimited Removal and Off-site Disposal**

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	
2	WWTP Building Demolition	est.	1	\$250,000	\$250,000	
3	Vertical barrier wall	sf	32,000	\$35	\$1,120,000	Sheet pile wall 2,000 linear feet 16 feet deep along shoreline.
4	Excavation	cy	225,000	\$5	\$1,125,000	Fill material in Park, less volume used as backfill in upper bluff
5	Transportation to off-site landfill	ton	382,500	\$25	\$9,562,500	
6	Disposal	ton	382,500	\$18	\$6,885,000	
7	Backfill	cy	225,000	\$12	\$2,700,000	
8	Excavation de-watering equipment	Est.	1	\$250,000	\$250,000	Pumps and holding tanks
9	Waste water treatment	Gallon	5,184,000	\$0.05	\$259,200	Existing treatment system (20 gpm for 180 days)
10	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
11	24 hr. Security of Site	weekly	40	\$2,695	\$107,800	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
12	Perimeter Fence	In ft	2500	\$20	\$50,000	Fence around excavation area
	subtotal				<u>\$22,591,722</u>	
	Mobilization/Demobilization @	5%	of	\$22,591,722	\$1,129,586	
	Engineering @	15%	of	\$22,591,722	\$3,388,758	
	Construction Oversight @	15%	of	\$22,591,722	\$3,388,758	
				Subtotal	\$30,498,825	
	Contingency @	20%	of	\$22,591,722	\$4,518,344	
				Total	\$35,017,169	
GRAND TOTAL					\$42,928,152	

<u>Summary</u>	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$5,103,860	\$255,193	\$765,579	\$765,579	\$1,020,772	\$7,910,983
Limited removal and off-site disposal - Kreher Park	\$22,591,722	\$1,129,586	\$3,388,758	\$3,388,758	\$4,518,344	\$35,017,169
Total Estimated Cost	<u>\$27,695,582</u>	<u>\$1,384,779</u>	<u>\$4,154,337</u>	<u>\$4,154,337</u>	<u>\$5,539,116</u>	<u>\$42,928,152</u>

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1-6
Alternate S4A: Limited Removal and On-site Disposal (One Acre Disposal Cell)

Containment:

Excavation - Limited Removal

Remove NAPL contaminated soil

1.7 ton/cubic yard

Volume to Remove

9,400 cy

150 cy

4,800 cy

NSPW Property South of St. Claire Street

NSPW Property North of St. Claire Street

Former Coal Tar Dump Area

Surface Barriers

Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:

26,000 sq ft

22,000 sq ft

98,000 sq ft

NSPW Property South of St. Claire Street

NSPW Property North of St. Claire Street

Marina Parking Lot Area

Low Permeability Cap -

Includes 3 feet of clay.

42,500 sq ft

Former Coal Tar Dump Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000	Center section of NSPW building overlying filled ravine. Removal/demolition of buried gas holders.
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000	
3	Excavation	cy	9,550	\$5	\$47,750	Transport to disposal cell in Kreher Park Will utilize salvaged clean fill from Kreher Park
4	Transportation (on-site)	ton	16,235	\$2	\$32,470	
6	Backfill	cy	9,550	\$3	\$28,650	Pumps and holding tanks Existing treatment system (5 gpm for 20 days)
7	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	
8	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	NSPW Property North of St. Claire Street (includes grading) Includes move/abandon existing buried sanitary and gas utilities
9	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000	
10	Move/Abandon Existing Utilities	ls	1	\$10,000	\$10,000	\$15/hr X 24 hr X 7 days + \$25/day (expenses) Fence around excavation area
11	24 hr. Security of Site	weekly	4	\$2,695	\$10,780	
12	Perimeter Fence	In ft	500	\$20	\$10,000	
				Subtotal	\$1,451,850	
Mobilization/Demobilization @		5%	of	\$1,451,850	\$72,593	
Engineering @		15%	of	\$1,451,850	\$217,778	
Construction Oversight @		15%	of	\$1,451,850	\$217,778	
				Subtotal	\$1,959,998	
Contingency @		20%	of	\$1,451,850	\$290,370	
				Total	\$2,250,368	

Table F1-6
Alternate S4A: Limited Removal and On-site Disposal (One Acre Disposal Cell)

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	
2	Excavation	cy	4,800	\$5	\$24,000	Former coal tar dump area to 5 feet.
3	Transportation (on-site)	ton	8,160	\$2	\$16,320	Transport to disposal cell in Kreher Park
4	Backfill	cy	4,800	\$12	\$57,600	Former coal tar dump area.
5	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	Pumps and holding tanks
6	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	Existing treatment system (5 gpm for 20 days)
7	Installation of low permeability cap	cy	4,722	\$25	\$118,056	3 ft. of clay over former coal tar dump area
8	Top Soil	sq. yd.	4,722	\$18	\$85,000	0.5 ft. topsoil cover over clay cap
9	Vegetation	acre	1	\$3,500	\$3,415	Seeding
10	Disposal cell permit and sitting	Est.	1	\$35,000	\$35,000	
11	Disposal cell liner and cap	Acre	1	\$350,000	\$350,000	
12	Storm water Drainage System	Basin	1	\$30,000	\$30,000	For water runoff during storm post-remediation
13	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
14	24 hr. Security of Site	weekly	2	\$2,695	\$5,390	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
15	Perimeter Fence	In ft	750	\$20	\$15,000	Fence around excavation area
	subtotal			Subtotal	\$1,054,203	
	Mobilization/Demobilization @	5%	of	\$1,054,203	\$52,710	
	Engineering @	15%	of	\$1,054,203	\$158,130	
	Construction Oversight @	15%	of	\$1,054,203	\$158,130	
				Subtotal	\$1,423,174	
	Contingency @	20%	of	\$1,054,203	\$210,841	
				Total	\$1,634,014	

GRAND TOTAL \$3,884,382

Summary

	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$1,451,850	\$72,593	\$217,778	\$217,778	\$290,370	\$2,250,368
Limited removal and off-site disposal - Kreher Park	\$1,054,203	\$52,710	\$158,130	\$158,130	\$210,841	\$1,634,014
Total Estimated Cost	\$2,506,053	\$125,303	\$375,908	\$375,908	\$501,211	\$3,884,382

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1-7
Alternate S4B: Unlimited Removal and On-site Disposal (Four Acre Disposal Cell)

Containment:

Excavation - Limited Removal
 Remove NAPL contaminated soil

1.7 ton/cubic yard

Volume to Remove
 35,000 cy
 4,800 cy

Filled Ravine Volume
 Former Coal Tar Dump Area

Surface Barriers

Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:

26,000 sq ft
 22,000 sq ft
 98,000 sq ft

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Marina Parking Lot Area

Low Permeability Cap -

Includes 3 feet of clay.

42,500 sq ft

Former Coal Tar Dump Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000	Center section of NSPW building overlying filled ravine. Removal/demolition of buried gas holders.
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000	
3	Excavation	cy	35,000	\$5	\$175,000	Transport to disposal cell in Kreher Park Will utilize salvaged clean fill from Kreher Park Pumps and holding tanks Existing treatment system (10 gpm for 40 days)
4	Transportation	ton	59,500	\$2	\$119,000	
6	Backfill	cy	35,000	\$3	\$105,000	
7	Excavation de-watering equipment	Est.	1	\$50,000	\$50,000	
8	Waste water treatment	Gallon	576,000	\$0.05	\$28,800	NSPW Property North of St. Claire Street (includes grading) Includes move/abandon existing buried sanitary and gas utilities \$15/hr X 24 hr X 7 days + \$25/day (expenses) Fence around excavation area
9	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000	
10	Move/Abandon Existing Utilities	ls	1	\$10,000	\$10,000	
11	24 hr. Security of Site	weekly	4	\$2,695	\$10,780	
12	Perimeter Fence	ln ft	500	\$20	\$10,000	
Subtotal					\$1,788,580	
Mobilization/Demobilization @				5%	\$89,429	
Engineering @				15%	\$268,287	
Construction Oversight @				15%	\$268,287	
Subtotal					\$2,414,583	
Contingency @				20%	\$357,716	
Total					\$2,772,299	

Table F1-7
Alternate S4B: Unlimited Removal and On-site Disposal (Four Acre Disposal Cell)

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	
2	WWTP Building Demolition	est.	1	\$250,000	\$250,000	
3	Excavation	cy	4,800	\$5	\$24,000	Former coal tar dump area to 5 feet.
4	Transportation (on-site)	ton	8,160	\$2	\$16,320	Transport to disposal cell in Kreher Park
5	Backfill	cy	4,800	\$12	\$57,600	Former coal tar dump area.
6	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	Pumps and holding tanks
7	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	Existing treatment system (5 gpm for 20 days)
8	Installation of low permeability cap	cy	4,722	\$25	\$118,056	3 ft. of clay over former coal tar dump area
9	Top Soil	sq. yd.	4,722	\$18	\$85,000	0.5 ft. topsoil cover over clay cap
10	Vegetation	acre	4	\$3,500	\$14,000	Seeding
11	Disposal cell permit and sitting	Est.	1	\$35,000	\$35,000	
12	Disposal cell liner and cap	Acre	4	\$350,000	\$1,400,000	
13	Storm water Drainage System	Basin	1	\$30,000	\$30,000	For water runoff during storm post-remediation
14	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
15	24 hr. Security of Site	weekly	2	\$2,695	\$5,390	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
16	Perimeter Fence	In ft	750	\$20	\$15,000	Fence around excavation area
	subtotal				<u>\$2,364,788</u>	
	Mobilization/Demobilization @	5%	of	\$2,364,788	\$118,239	
	Engineering @	15%	of	\$2,364,788	\$354,718	
	Construction Oversight @	15%	of	\$2,364,788	<u>\$354,718</u>	
				Subtotal	\$3,192,464	
	Contingency @	20%	of	\$2,364,788	\$472,958	
	Total				<u>\$3,665,421</u>	

GRAND TOTAL \$6,437,720

<u>Summary</u>	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$1,788,580	\$89,429	\$268,287	\$268,287	\$357,716	\$2,772,299
Limited removal and off-site disposal - Kreher Park	\$2,364,788	\$118,239	\$354,718	\$354,718	\$472,958	\$3,665,421
Total Estimated Cost	<u>\$4,153,368</u>	<u>\$207,668</u>	<u>\$623,005</u>	<u>\$623,005</u>	<u>\$830,674</u>	<u>\$6,437,720</u>

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1-8
Alternate S5A: Limited Removal and On-site Thermal Treatment

Containment:

Excavation - Limited Removal
 Remove NAPL contaminated soil

1.7 ton/cubic yard

Volume to Remove
 9,400 cy
 150 cy
 4,800 cy

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Former Coal Tar Dump Area

Surface Barriers

Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:
 26,000 sq ft
 22,000 sq ft
 98,000 sq ft

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Marina Parking Lot Area

Low Permeability Cap -

Includes 3 feet of clay.

42,500 sq ft

Former Coal Tar Dump Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000	Center section of NSPW building overlying filled ravine. Removal/demolition of buried gas holders.
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000	
3	Excavation	cy	9,550	\$5	\$47,750	Assumes 10% of fill not suitable for thermal treatment
4	Transportation for off-site landfill	ton	1,624	\$25	\$40,588	
5	Sorting and Disposal (unsuitable material)	ton	1,624	\$18	\$29,223	Thermal desorption and on-site placement of treated soil.
6	Thermal Treatment	ton	14,612	\$100	\$1,461,150	
7	Backfill	cy	9,550	\$12	\$114,600	Pumps and holding tanks Existing treatment system (5 gpm for 20 days)
8	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	
9	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	NSPW Property North of St. Claire Street (includes grading) Includes move/abandon existing buried sanitary and gas utilities
10	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000	
11	Move/Abandon Existing Utilities	ls	1	\$10,000	\$10,000	\$15/hr X 24 hr X 7 days + \$25/day (expenses) Fence around excavation area
12	24 hr. Security of Site	weekly	4	\$2,695	\$10,780	
13	Perimeter Fence	In ft	500	\$20	\$10,000	
				Subtotal	\$3,036,291	
Mobilization/Demobilization @		5%	of	\$3,036,291	\$151,815	
Engineering @		15%	of	\$3,036,291	\$455,444	
Construction Oversight @		15%	of	\$3,036,291	\$455,444	
				Subtotal	\$4,098,992	
Contingency @		20%	of	\$3,036,291	\$607,258	
				Total	\$4,706,250	

Table F1-8
Alternate S5A: Limited Removal and On-site Thermal Treatment

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	
2	Excavation	cy	4,800	\$5	\$24,000	Former coal tar dump area to 5 feet.
3	Transportation	ton	816	\$25	\$20,400	
4	Sorting and Disposal (unsuitable material)	ton	816	\$18	\$14,688	
5	Thermal Treatment	ton	7,344	\$100	\$734,400	Assumes 10% of fill not suitable for thermal treatment
6	Backfill	cy	4,800	\$12	\$57,600	
7	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	Pumps and holding tanks
8	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	Existing treatment system (5 gpm for 20 days)
9	Installation of low permeability cap	cy	4,722	\$25	\$118,056	3 ft. of clay over former coal tar dump area
10	Top Soil	sq. yd.	4,722	\$18	\$85,000	0.5 ft. topsoil cover over clay cap
11	Vegetation	acre	1	\$3,500	\$3,500	Seeding
12	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
13	24 hr. Security of Site	weekly	2	\$2,695	\$5,390	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
14	Perimeter Fence	In ft	750	\$20	\$15,000	Fence around excavation area
	subtotal			Subtotal	\$1,392,456	
	Mobilization/Demobilization @	5%	of	\$1,392,456	\$69,623	
	Engineering @	15%	of	\$1,392,456	\$208,868	
	Construction Oversight @	15%	of	\$1,392,456	\$208,868	
				Subtotal	\$1,879,815	
	Contingency @	20%	of	\$1,392,456	\$278,491	
				Total	\$2,158,306	

GRAND TOTAL \$6,864,557

Summary

	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$3,036,291	\$151,815	\$455,444	\$455,444	\$607,258	\$4,706,250
Limited removal and off-site disposal - Kreher Park	\$1,392,456	\$69,623	\$208,868	\$208,868	\$278,491	\$2,158,306
Total Estimated Cost	\$4,428,746	\$221,437	\$664,312	\$664,312	\$885,749	\$6,864,557

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1-9
Alternate S5B: Limited Removal and Off-site Incineration

Containment:

Excavation - Limited Removal
 Remove NAPL contaminated soil

1.7 ton/cubic yard

Volume to Remove
 9,400 cy
 150 cy
 4,800 cy

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Former Coal Tar Dump Area

Surface Barriers
Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:
 26,000 sq ft
 22,000 sq ft
 98,000 sq ft

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Marina Parking Lot Area

Low Permeability Cap -
 Includes 3 feet of clay.

42,500 sq ft

Former Coal Tar Dump Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000	Center section of NSPW building overlying filled ravine. Removal/demolition of buried gas holders.
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000	
3	Excavation	cy	9,550	\$5	\$47,750	
4	Transportation for off-site landfill	ton	1,624	\$25	\$40,588	Assumes 10% of fill not suitable for thermal treatment
5	Sorting and Disposal (unsuitable material)	ton	1,624	\$18	\$29,223	
7	Transportation for off-site incineration	ton	14,612	\$50	\$730,575	
8	Incineration	ton	14,612	\$200	\$2,922,300	Pumps and holding tanks Existing treatment system (5 gpm for 20 days) NSPW Property North of St. Claire Street (includes grading) Includes move/abandon existing buried sanitary and gas utilities \$15/hr X 24 hr X 7 days + \$25/day (expenses) Fence around excavation area
9	Backfill	cy	9,550	\$12	\$114,600	
10	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	
11	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	
12	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000	
13	Move/Abandon Existing Utilities	ls	1	\$10,000	\$10,000	
14	24 hr. Security of Site	weekly	4	\$2,695	\$10,780	
15	Perimeter Fence	In ft	500	\$20	\$10,000	
	subtotal			Subtotal	\$5,228,016	
	Mobilization/Demobilization @	5%	of	\$5,228,016	\$261,401	
	Engineering @	15%	of	\$5,228,016	\$784,202	
	Construction Oversight @	15%	of	\$5,228,016	\$784,202	
				Subtotal	\$7,057,821	
	Contingency @	20%	of	\$5,228,016	\$1,045,603	
				Total	\$8,103,424	

**Table F1-9
Alternate S5B: Limited Removal and Off-site Incineration**

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	Former coal tar dump area to 5 feet.
2	Excavation	cy	4,800	\$5	\$24,000	Former coal tar dump area to 5 feet.
3	Transportation for off-site landfill	ton	816	\$25	\$20,400	
4	Sorting and Disposal (unsuitable material)	ton	816	\$18	\$14,688	Assumes 10% of fill not suitable for thermal treatment
5	Transportation for off-site incineration	ton	7,344	\$50	\$367,200	
6	Incineration	ton	7,344	\$200	\$1,468,800	
7	Backfill	cy	1	\$12	\$12	
8	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	Pumps and holding tanks
9	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	Existing treatment system (5 gpm for 20 days)
10	Installation of low permeability cap	cy	4,722	\$25	\$118,056	3 ft. of clay over former coal tar dump area
11	Top Soil	sq. yd.	4,722	\$18	\$85,000	0.5 ft. topsoil cover over clay cap
12	Vegetation	acre	1	\$3,500	\$3,500	Seeding
13	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
14	24 hr. Security of Site	weekly	2	\$2,695	\$5,390	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
15	Perimeter Fence	In ft	750	\$20	\$15,000	Fence around excavation area
	subtotal			Subtotal	\$2,436,468	
	Mobilization/Demobilization @	5%	of	\$2,436,468	\$121,823	
	Engineering @	15%	of	\$2,436,468	\$365,470	
	Construction Oversight @	15%	of	\$2,436,468	\$365,470	
				Subtotal	\$3,289,232	
	Contingency @	20%	of	\$2,436,468	\$487,294	
				Total	\$3,776,525	

GRAND TOTAL \$11,879,949

Summary

	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$5,228,016	\$261,401	\$784,202	\$784,202	\$1,045,603	\$8,103,424
Limited removal and off-site disposal - Kreher Park	\$2,436,468	\$121,823	\$365,470	\$365,470	\$487,294	\$3,776,525
Total Estimated Cost	\$7,664,483	\$383,224	\$1,149,672	\$1,149,672	\$1,532,897	\$11,879,949

Long term groundwater monitoring costs are included with groundwater remedial alternatives.

Table F1-10
Alternate S6: Limited Removal and On-site Soil Washing

Containment:

Excavation - Limited Removal
 Remove NAPL contaminated soil

1.7 ton/cubic yard

Volume to Remove
 9,400 cy
 150 cy
 4,800 cy

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Former Coal Tar Dump Area

Surface Barriers

Asphalt Pavement -

Includes 6 inches stone, 3 inches binder, 2 inches surface.

Total Area:
 26,000 sq ft
 22,000 sq ft
 98,000 sq ft

NSPW Property South of St. Claire Street
 NSPW Property North of St. Claire Street
 Marina Parking Lot Area

Low Permeability Cap -

Includes 3 feet of clay.

42,500 sq ft

Former Coal Tar Dump Area

Upper Bluff Area

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
1	Building Demolition	Est.	1	\$50,000	\$50,000
2	Gas Holder Removal	Est.	1	\$30,000	\$30,000
3	Excavation	cy	9,550	\$5	\$47,750
4	Transportation for off-site landfill	ton	1,624	\$25	\$40,588
5	Disposal	ton	1,624	\$18	\$29,223
6	Soil Wash	ton	14,612	\$150	\$2,191,725
7	Backfill	cy	1,624	\$12	\$19,482
8	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000
9	Waste water treatment	Gallon	144,000	\$0.05	\$7,200
10	Installation of new asphalt pavement	sq. yd.	48,000	\$25	\$1,200,000
11	Move/Abandon Existing Utilities	ls	1	\$10,000	\$10,000
12	24 hr. Security of Site	weekly	4	\$2,695	\$10,780
13	Perimeter Fence	In ft	500	\$20	\$10,000
Subtotal					\$3,671,748
	Mobilization/Demobilization @	5%	of	\$3,671,748	\$183,587
	Engineering @	15%	of	\$3,671,748	\$550,762
	Construction Oversight @	15%	of	\$3,671,748	\$550,762
Subtotal					\$4,956,859
	Contingency @	20%	of	\$3,671,748	\$734,350
Total					\$5,691,209

Notes

Center section of NSPW building overlying filled ravine.
 Removal/demolition of buried gas holders.

Assumes 10% of fill not suitable for thermal treatment

Thermal desorption and on-site placement of treated soil.

Pumps and holding tanks
 Existing treatment system (5 gpm for 20 days)
 NSPW Property North of St. Claire Street (includes grading)
 Includes move/abandon existing buried sanitary and gas utilities
 \$15/hr X 24 hr X 7 days + \$25/day (expenses)
 Fence around excavation area

Table F1-10
Alternate S6: Limited Removal and On-site Soil Washing

Kreher Park

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Clear & Grub	est.	1	\$10,000	\$10,000	
2	Excavation	cy	4,800	\$5	\$24,000	Former coal tar dump area to 5 feet.
3	Transportation	ton	816	\$25	\$20,400	
4	Disposal	ton	816	\$18	\$14,688	Assumes 10% of fill not suitable for thermal treatment
5	Soil Wash	ton	7,344	\$150	\$1,101,600	
6	Backfill	cy	816	\$12	\$9,792	
7	Excavation de-watering equipment	Est.	1	\$25,000	\$25,000	Pumps and holding tanks
8	Waste water treatment	Gallon	144,000	\$0.05	\$7,200	Existing treatment system (5 gpm for 20 days)
9	Installation of low permeability cap	cy	4,722	\$25	\$118,056	3 ft. of clay over former coal tar dump area
10	Top Soil	sq. yd.	4,722	\$18	\$85,000	0.5 ft. topsoil cover over clay cap
11	Vegetation	acre	1	\$3,500	\$3,500	Seeding
12	Installation of new asphalt pavement	sq. yd.	10,889	\$25	\$272,222	Marina Parking Lot Area
13	24 hr. Security of Site	weekly	2	\$2,695	\$5,390	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
14	Perimeter Fence	In ft	750	\$20	\$15,000	Fence around excavation area
Subtotal					\$1,711,848	
Mobilization/Demobilization @		5%	of	\$1,711,848	\$85,592	
Engineering @		15%	of	\$1,711,848	\$256,777	
Construction Oversight @		15%	of	\$1,711,848	\$256,777	
Subtotal					\$2,310,995	
Contingency @		20%	of	\$1,711,848	\$342,370	
Total					\$2,653,364	

GRAND TOTAL \$8,344,573

Summary

	<u>Capital Costs</u>	<u>Mod / Demob</u>	<u>Engineering</u>	<u>Construction Oversight</u>	<u>Contingency</u>	<u>Estimated Cost</u>
Limited removal and off-site disposal - upper bluff area	\$3,671,748	\$183,587.38	\$550,762	\$550,762	\$734,350	\$5,691,209
Limited removal and off-site disposal - Kreher Park	\$1,711,848	\$85,592.39	\$256,777	\$256,777	\$342,370	\$2,653,364
Total Estimated Cost	\$5,383,595	\$269,180	\$807,539	\$807,539	\$1,076,719	\$8,344,573

Long term groundwater monitoring costs are included with groundwater remedial alternatives.